Some observations on birds at high altitude lake sides in Gosainkund, central Nepal[1 & 2]

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(With a map)

Simple bird censuses by the line transect method were carried out by the side of high altitude lakes, at about 4,300 m altitude in Gosainkund, central Nepal on June 4-5, 1968. In total, ten species and a few unidentified ones were noted in the cirque. Another five species were observed outside of the census areas. The status of each species at high elevations in Gosainkund is briefly described together with previous records from central Nepal. The average bird density around the lakes was 13.5 per hour or 4.5 per ha. An unusually high density of 54.0 per hour or 18.1 per ha. was recorded on 4 June. This high concentration probably was due to a temporary fall of snow. The density of birds at the lake sides seemed to be higher than that of other areas, excluding tarns or streams, at the same altitude in Gosainkund.

Since the middle of the last century reports on the distribution of birds in Nepal have been published by many authors such as Gray & Gray (1846), Scully (1879), Smythies (1948, 1950), Proud (1949, 1952, 1955), Ripley (1950), Rand & Fleming (1957), Fleming & Traylor (1961, 1964), Fleming (1968), etc. Recently Biswas (1960-1966) has compiled serial catalogues of birds known from Nepal based upon a bibliographical survey and his original observations. But there are few ecological observations except the important work by Diesselhorst (1968) and no record on the actual abundance of Nepalese birds has yet been given at all.

From March to July 1968, I had an opportunity to observe many birds from the tarai up to the alpine zone in central Nepal and on the Kali Gandak watershed in west-central Nepal[3] as a member of the Hokkaido University Scientific Expedition to Nepal Himalaya 1968. While trekking in the country, I tried to census birds in different

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[2] Accepted February 28, 1973.

[3] Divisions of Nepal used here conform to the usage by Biswas (1960).

habitats. The present paper deals with results obtained at the highest altitude the party reached.

Habitat and Methods

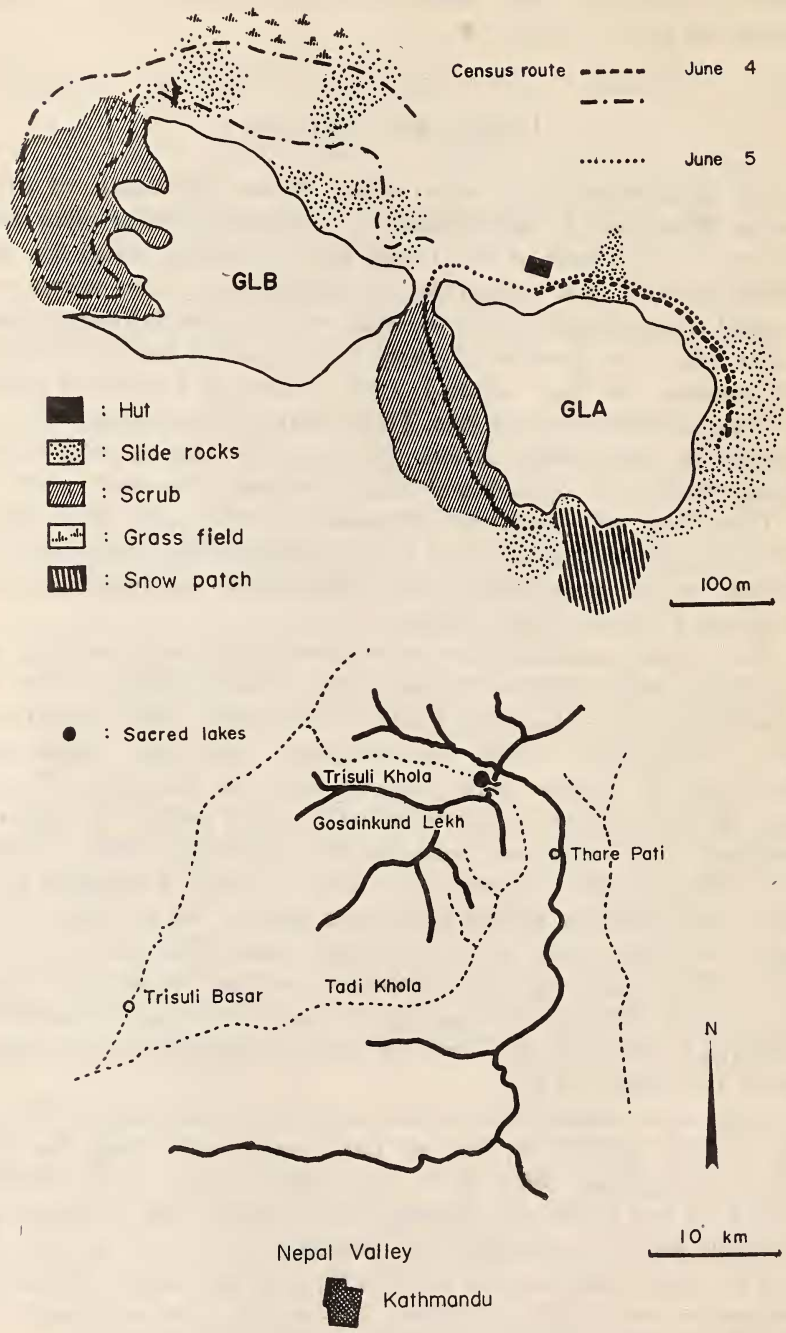
The Gosainkund Lekh lies at about 40 km northwards of Kathmandu, the capital of Nepal. Beneath its crest are seven or more montane tarns at the head of the Trisuli Khola. Trekking along the trail running upwards to the pass from the Tadi Khola, I came across only six small lakes, the upper three of which were completely frozen. Beside a clear lake at an elevation of about 4,300 m, some huts and an altar with standing tall flags (*tarcho*) were situated on a slope of debris. This was the famous sacred lake. Three fourth of its circumference was encircled by steep rocky inclines and water fell from a northwestern opening down to a lower lake through a cascade of several metres.

These lakes are henceforth abbreviated as GLA and GLB respectively. Accurate measurements of size and shape of both lakes were not secured, but the circumference was estimated to be about 850 m in GLA and 1,200 m in GLB (Map).

The slopes around the lakes were barren rock slides extending upwards from about 4,000 m (a few shrubs of rhododendrons were still occasionally seen). The western sides of both lakes were covered with dwarf rhododendron scrub; *R. anthopogon* with pale yellow-white flowers and *R. setosum* with pink-rose ones past full bloom. Besides these, the surroundings were covered with meagre patches of vegetation composed of *Primula* and *Potentilla* both in bloom, mosses, lichens, and withered sedges. Nematocera, *Carabus, Lacon, Eubasilissa nepalensis* and small dung beetles were found under or on the debris of the water's edge and many active long-legged flies, *Hydrophorus,* on the snow. Some earthworms and centipedes were also found under stones on the scree. Although the quantity of these insects was not accurately measured at each lake side, food for birds was apparently more abundant at GLA than GLB.

Birds were counted twice at the side of GLA and once at GLB by line transect method. At first all birds encountered along the GLA side, covering about 300 × 50 m, were recorded from 8.00 to 8.30 on June 4. It was cloudy but sometimes fine and the light snow that fell overnight was 4-6 cm deep. Air temperature was 2°C at 8.00. The next day was cloudy and the snow in the area had almost thawed. Air temperature was 0.5°C at 6.00 and the second count was carried out from 6.30 to 7.30, covering 600 × 50 m along the water side.

All birds were counted near the GLB, covering 1,200 × 50 m, from 15.45 to 18.00 on June 4. On the way the census had to be stopped



Map. Sketch map of Gosainkund and sacred lakes.

for about three quarters of an hour due to heavy rain-fall and dense fog. Air temperature was 6.5°C at 15.15.

Results

Birds encountered during each census are arranged in Table 1. Absolute number counted, dominance, average density per unit time and area in each species are shown in Table 2, omitting the result of the first census which was somewhat peculiar as described in the conclusion.

Most of the birds observed were moving about or searching for food among the rocks at the water's edge, excepting the following individuals: Two *Prunella* preening on rocks away from the water, and two flying towards the scrub of dwarf rhododendrons; four *Anthus hodgsoni* flying over the lakes, two of them holding worms or something similar between their bills, and one calling from a rock and another doing so on the wing; *A. cervinus* giving the alarm call from a stone wall; a pair of *Leucosticte* hopping on the small grass field; one *Chaimarrornis* often driving away an *Anthus* from the debris, and two passing over the lake at about 2 m high; two male *Monticola* chasing each other on the rock slide; a *Zoothera* taking insects or worms on the ground under the shade of a large rock; two *Tadorna* coming from southwest and flying away towards the eastern crest of the ridge after circular flights at about 20 m height over my head; a female *Aythya* floating at the margin of GLB (not seen anywhere next morning); all birds of uncertain identification were flying rapidly between the rocks or high overhead.

The status of each species at high altitude in central Nepal is briefly outlined below. These comments are based upon both original observations and previous records.

Prunella collaris nipalensis (Blyth): Eastern Alpine Hedge Sparrow.

Three male specimens collected after the census were all *nipalensis*. This subspecies seems to be reported only in central Nepal after Hodgson's collection; that is Smythies' observation on the Gandak-Kosi watershed at 4,570 m in September. But it was the most dominant and common bird along streams and tarns at 4,160-4,500 m in the area observed along the pilgrim trail.

On June 5, I recorded four birds of this species beneath the pass hopping on rocks near the frozen lake at 4,500 m, another two birds were each on different streams at 4,250-4,220 m and finally one was searching for food on the ground of the cirque at 4,160 m at the head of the Tadi Khola. Three specimens obtained there had already enlarged testes, 11-14 × 16-20 mm, indicating that they were just in season.

TABLE 1

NUMBER OF INDIVIDUALS, DOMINANCE AND DENSITY OF ALL SPECIES OBSERVED IN EACH CENSUS.

Species	Census round GLA First				Census round GLA Second				Census round GLB			
	N	D	Density per hour	Density per ha	N	D	Density per hour	Density per ha	N	D	Density per hour	Density per ha
P. collaris	12	44	24.0	8.0	5	28	5.0	1.7	6	25	2.8	1.0
A. roseatus	6	22	12.0	4.0	3	17	3.0	1.0	3	13	1.4	0.5
A. hodgsoni	4	15	8.0	2.7	2	11	2.0	0.7	2	8	0.9	0.3
A. cervinus	2	7	4.0	1.3					2	8	0.9	0.3
C. leucocephalus	1	4	2.0	0.7	2	11	2.0	0.7	4	17	1.9	0.7
L. nemoricola					2	11	2.0	0.7	2	8	0.9	0.3
M. rufiventris									2	8	0.9	0.3
Z. mollissima	1	4	2.0	0.7								
T. ferruginea					2	11	2.0	0.7				
A. fuligula									1	4	0.5	0.2
Uncertain	1	4	2.0	0.7	2	11	2.0	0.7	2	8	0.9	0.3
Total	27	100	54.0	18.1	18	100	18.0	6.2	24	100	11.1	3.9

N: Number of individuals.
D: Dominance (%).

TABLE 2

TOTAL NUMBER OF INDIVIDUALS, AVERAGE DOMINANCE AND DENSITY OF CENSUSES EXCEPT THE FIRST ONE AT GLA.

Species	No. of individuals	Dominance (%)	Density per hour	Density per ha
P. collaris	11	26.2	3.4	1.2
A. roseatus	6	14.3	1.9	0.7
A. hodgsoni	4	9.5	1.3	0.4
A. cervinus	2	4.8	0.7	0.2
C. leucocephalus	6	14.3	1.9	0.7
L. nemoricola	4	9.5	1.3	0.4
M. rufiventris	2	4.8	0.7	0.2
T. ferruginea	2	4.8	0.7	0.2
T. fuligula	1	2.4	0.3	0.1
Uncertain	4	9.5	1.3	0.4
Total	42	100	13.5	4.5

The individuals caught by Diesselhorst (1968) in eastern Nepal from late June to mid August also had well developed gonads and he suggested that their breeding would begin in June.

Anthus roseatus Blyth: Hodgson's Pipit.

Smythies (1948) did not come across this bird at Gosainkund in autumn, though Scully (1879), Proud (1955), and Rand & Fleming (1957) found it not uncommon in the Nepal Valley in winter and Polunin (1955) recorded it as abundant at about 3,000 m up in central Nepal in summer. It seems to be common at about 4,300-4,700 m in west-central Nepal (Lowndes 1955) and breeds in the alpine zone in Nepal (Biswas 1960; Diesselhorst 1968).

I came across these birds at 4,160-4,300 m in Gosainkund. A specimen caught around the lake had developed testes 8 × 5 mm, and many bits of insects, mostly broken Nematocera, were found in its stomach.

Anthus hodgsoni Richmond: Indian Tree Pipit.

It is not prudent to identify this as *A. h. yunnanensis* or *A. h. hodgsoni*, but all previous records on the former indicate that it occurs below 3,000 m while *hodgsoni* seems mainly to breed at the higher altitude of 3,000-4,000 m in Nepal (Diesselhorst 1968).

Anthus cervinus Pallas: Redthroated Pipit.

This species seems to be scarce in Nepal; after Hodgson's collection there are neither sight records nor collected examples except a single one obtained by Rand & Fleming (1957). The author, however, met with several individuals of this species at 4,220-4,350 m and they could be apparently distinguished from other pipits found in the same area by means of their bright cinnamon-red supercilium, throat and breast, especially in comparison with the vinous-pink *roseatus*.

Chaimarrornis leucocephalus (Vigors): Whitecapped Redstart.

Three or four birds were sometimes flying about our camping place. This was a bird characteristic of streams or tarns as already noted by Smythies (1948) at the eastern side of Gosainkund. These birds, uttering short notes, were observed up to 4,480 m on June 5 and were also common in the cirque beyond the pass to the Tadi Khola.

Zoothera mollissima (Blyth) or **dixoni** (Seebohm): Plainbacked or Longtailed Mountain Thrush.

This thrush was very rare in the alpine zone. This sight record was insufficient to positively identify the bird as *mollissima* or *dixoni*, but it may furnish information. Diesselhorst (1968) pointed out the possibility of their ecological segregation with *dixoni* in forest and *mollissima* in the alpine or over the forest zone. In eastern Nepal he occasionally found "Zoothera Drosseln" at 4,300-4,400 m in habitats such as rock slide areas and poor vegetation without trees similar to habitats in my survey.

This species has been reported from central Nepal only at 1,500-3,600 m by Smythies (1948, 1950), Proud (1955), and Rand & Fleming (1957). The present case, however, may be the first sight record at such a high altitude in central Nepal. Abe, a member of the party, also recognized a similar *Zoothera* near the lake in the afternoon.

Leucosticte nemoricola (Hodgson): Hodgson's Mountain Finch.

Moved in pairs. Neither Smythies (1948) nor Proud (1952) found this species at the Gandak-Kosi watershed, but Polunin (1955) obtained it in the Langtan Khola, central Nepal. Diesselhorst (1968) enumerated it as a typical alpine bird in Nepal and Martens (1971) found it at about 3,000 m in non-breeding season.

Tadorna ferruginea (Pallas): Ruddy Sheld-duck or Brahminy Duck.

Scully (1879), Ripley (1950), and Rand & Fleming (1957) recorded it as common in the tarai and occasional in the Nepal Valley. I saw no other individuals in the country. This case might be a rare sight record at this high altitude in central Nepal. Biswas (1960) reported that he found this species preparing to breed at about 5,000-5,300 m, but Diesselhorst (1968) conservatively admitted its probable propagation, considering the impossibility of its usual breeding activity at those alpine lakes.

Monticola rufiventris (Jardine & Selby): Chestnutbellied Rock Thrush.

The individuals observed seemed to be *rufiventris,* because no white patches on wings characteristic of *cinclorhynchus* were seen. A pair was seen near the frozen tarns at 4,460 m and the male was singing loudly on a rock. Moreover, a pair calling and moving around on rock debris at 4,250 m was found beyond the pass on the way to Thare Pati. Hitherto the species has been recorded only below 3,350 m in autumn (Smythies 1948) and 2,440 m even in spring (Proud 1952) in central Nepal.

Aythya fuligula (Linnaeus): Tufted Duck.

Ripley (1950) found it in ponds and on the rivers around the Nepal Valley and it seems to be fairly common in the lowlands during winter (Rand & Fleming 1957). Masatomi (1971) found four males and six females floating on a pond near Trisuli at about 700 m on May 28. The occurrence of the species may be very uncommon at such high altitude in central Nepal, but Biswas (1960) observed it on montane lakes at about 5,000-5,300 m in eastern Nepal in May.

Besides the birds mentioned above, the following species were occasionally found around the sacred lakes during 3-5 June.

Myiophoneus caeruleus (Scopoli): Whistling Thrush.

Noted resting for a moment on rocks near the lake side, then it flew north towards the ridge. Smythies (1948) did not mention it in his list, but Proud (1955) and Polunin (1955) found it up to only 3,500 m

in central Nepal. On the way to Thare Pati at 3,800 m, I saw another.

Grandala coelicolor Hodgson: Hodgson's Grandala.

One male on June 5. After stopping a while on rocks it flew away northwards. A flock of this typical alpine species feeding on scree was found in a cirque and three specimens were collected at the head of the Tadi Khola at 4,160 m. A female obtained had a fully developed egg with a soft shell in her uterus. Smythies (1948) saw it at about 4,500 m in the same area and Diesselhorst (1968) caught specimens at 4,100-5,200 m in eastern Nepal.

Carpodacus puniceus puniceus (Blyth): Nepal Redbreasted Rosefinch.

A female was obtained near the Kharka on June 3. On the Gosainkund Lekh only Smythies (1948) observed a male at about 3,650 m in September.

Partridge and kite.

The call notes of snow partridges were heard several times from the upper margin of the northern cliff rising at a distance from the lake, though I failed to find them in the fog. On June 4 a bird, probably a kite passed over the ridge far from me, gliding in a southerly direction.

Conclusion

The avifauna of the area observed in early June 1968 were characterized by the most dominant alpine hedge sparrow, *P. collaris*, previously recorded at 4,570 m on the Gosainkund Lekh (Smythies 1948). The next abundant birds were subalpine or alpine pipits, *Anthus* group, and the redstart, *C. leucocephalus*, occuring up to 5,335 m in summer (Biswas 1961). The others were typical alpine birds, that is, the grandala and the mountain finch. Though Diesselhorst (1968) listed six species as common dwellers in a restricted vertical range in "Feuchte alpine Gebusche und Matten" 4,200-5,200 m, only three of them, *P. collaris*, *A. roseatus*, and *L. nemoricola* were found common at the lake sides in the present case.

Appearance of ducks at such high elevations might be rare but partly relates to the existence of tarns in the area. They must stay here only temporarily, for they did not appear to be breeding here.

It was remarkable that the results of first census made on June 4 showed a concentration of birds more than three or four times denser than in other cases. Particularly *Prunella* and *Anthus* were abundant at GLA; about five times as many as on the next day. Although these unusual results might depend partly on the difference of census time, they must have been caused mainly by the snow fall on June 4 which temporarily covered all fields and made food hard to get for the birds.

In fact, after much of the snow had thawed by afternoon, I found birds on the rocky slopes studded with grassy patches a little distance from the lake. Few birds had been counted here during the first census.

The density at GLA seemed to be slightly higher than that at GLB. Analysis of both habitats were not sufficient to specify the factors causing such different congregations, but as described above many more insects were found at GLA, especially at the northern side, than at GLB. The comparison of individual numbers of birds at the different sites seems to be of less significance statistically, because the number of censuses was small and the conditions were fairly different.

The relative abundance of individual numbers in this census at this high altitude might be caused by birds wandering up to their breeding grounds. *C. leucocephalus,* for example, was not seen above 1,500 m in late March on the Gandak Kosi watershed by Proud (1952), but I recognized it as common up to about 4,500 m as Smythies (1948) found it in September. Naturally the population at the area may decrease in winter owing to freezing and snowfall covering all fields.

Although an actual count at other places at similar altitude was not undertaken, I felt that rocky slopes, excluding tarns or streams, had fewer birds than the area censused. Therefore, the number of birds recorded in the present case might indicate not the average (or the lowest) but more or less high (or the highest by Elton, 1933) density at this altitude in Gosainkund.

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References

Biswas, B. (1960-1966): The birds of Nepal. *J. Bombay nat. Hist. Soc.* *57*(2): 278-308, *57*(3):516-546, *58*(1): 100-134, *58*(2):441-474, *58*(3):653-677, *59*(1):200-227, *59*(3):807-821, *60*(1):173-200, *60*(2):388-399, *60*(3): 638-654, *63*(2):365-377.

Diesselhorst, G. (1968): Beiträe zur Okologie der Vögel zentral-und ost-Nepals. *Khumbu Himal.* *2*:1-417.

Elton, C. (1933): The ecology of animals. New York.

FLEMING, R. L., JR. (1968): Winter observations on the ecology and distribution of birds on the Kosi-Gandak watershed ridge, central Nepal. *Pavo, 6.*

FLEMING, R. L. & TRAYLOR, A. M. (1961): Notes on Nepal birds. *Fieldiana, Zool., 35*(8):441-487.

———— & ———— (1964): Further notes on Nepal birds. ibid., *35*(9):489-558.

*GRAY, J. E. & GRAY, G. R. (1846): Catalogue of the specimens and drawings of mammalia and bird of Nepal and Thibet, presented by B. H. Hodgson, Esq., to the British Museum, London.

LOWNDES, D. G. (1955): Some birds from north-western Nepal. *J. Bombay nat. Hist. Soc. 53*(1):28-37.

MARTENS, J. (1971): Zur Kenntnis des Vogelzuges im nepalischen Himalaya. *Vogelwarte 26*(1):113-128.

MASATOMI, H. (1971): Aves. in "Animals and plants of Nepal Himalaya" (in Japanese). 26-41. Sapporo.

POLUNIN, O. (1955): Some birds collected in Langtang Khola, Rasua Garhi District, central Nepal. *J. Bombay nat. Hist. Soc. 52*(4):886-896.

PROUD, D. (1949): Some notes on the birds of the Nepal Valley. ibid. *48*:696-719.

———— (1952): Some birds seen on the Gandak-Kosi watershed in March, 1951. ibid. *50*:355-366.

———— (1955): More notes on the birds of the Nepal Valley. ibid. *53*:(1):57-78.

RAND, A. L. & FLEMING, R. L. (1957): Birds from Nepal. *Fieldiana, Zool. 41*(1):1-218.

RIPLEY, S. D. (1950): Birds from Nepal, 1947-1949. *J. Bombay nat. Hist. Soc. 49*(3):355-417.

SCULLY, J. (1879): A contribution to the ornithology of Nepal. *Stray Feathers, 8*:204-368.

SMYTHIES, B. E. (1948): Some birds of the Gandak-Kosi watershed, including the pilgrim trail to the sacred lake of Gosainkund. *J. Bombay nat. Hist. Soc. 47*(3):432-518.

———— (1950): More notes on the birds of the Nepal Valley. ibid. *49*(3):513-518.

* Not referred to in original.